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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

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re Patent Application of:

unetaka TAKEUCHI, et al.

Application No.: 08/889,440 Group Art Unit: 2123

Filed: July 8, 1997 Examiner: H. Jones

For: APPARATUS AND METHOD FOR SIMULATING PHENOMENA OF A PARTICLE OF SUBSTRATE PARTICLES AND ADSORBATE PARTICLES

APPELLANTS' BRIEF UNDER 37 CFR § 1.192

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

In a Notice of Appeal filed on August 18, 2003, the Applicants appealed the Examiner's April 18, 2003 Office Action finally rejecting claims 1, 3-9, 11-20, and 22-31. Therefore, Appellants' Brief is due by October 18, 2003. October 18, 2003 being a Saturday, Appellants' Brief is due by Monday, October 20, 2003. Appellants' Brief, together with the requisite fee set forth in 37 CFR § 1.17(c), is submitted herewith.

I. REAL PARTY IN INTEREST (37 CFR § 1.192(C)(1))

The inventors Munetaka Takeuchi, Nozomu Kamiya, Hiromi Hayashi, and Makoto Ishitobashi assigned all rights in the subject application to Fujitsu Limited on January 8, 1998 according to the Assignment recorded on January 26, 1998 at reel 8927 on frame 0023. Therefore the real party in interest is Fujitsu Limited.

II. RELATED APPEALS AND INTERFERENCES (37 CFR § 1.192(C)(2))

There are no related appeals or interferences known to Appellants, Appellants' legal representatives or the Assignee, Fujitsu Limited, which will be directly affected by, or have a bearing on, the Board's decision in the pending appeal.

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III. STATUS OF CLAIMS (37 CFR § 1.192(C)(3))

Claims 1, 3-9, 11-20, and 22-31 are pending in the application. Claims 1, 3-9, 11-20, and 22-31 stand rejected under 35 U.S.C. § 112, first paragraph, for lack of enablement and inadequate written description; claims 1, 16, 20, 23, and 24 stand rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness; claims 1, 3-9, 11-20, and 22-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Misaka et al. (U.S. Patent No. 5,421,934) ("Misaka") or Baumann et al., 3D Modeling of Sputter and Reflow Processes for Interconnect Metals, 1995 ("Baumann") in view of examiner's own experience and the taking of Official Notice; claims 1, 3-9, 11-20, 22-26, and 28-31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yamada et al., A Sputter Equipment Simulation System Including Molecular Dynamical Target Atom Scattering Model, 1995 ("Yamada") or Misaka or Baumann or Husinsky et al., Fundamental aspects of SNMS for thin film characterization: Experimental studies and computer simulations, January 15, 1996 ("Husinsky") in view of Kinema/SIM ("Kinema/SIM")[1] or Reeves, Particle Systems – A Technique for Modeling a Class of Fuzzy Objects, ACM Transactions on Graphics, Vol. 2, No. 2, April 1983, p. 91-108 ("Reeves") or Cohen, Computer Animations, Quantum Mechanics and Elementary Particles, Europhys News 23, 1992, p. 163-166 ("Cohen"); and claims 1, 3-9, 11-20, and 22-31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohira et al., Molecular-Dynamics Simulations Of Hydrogenated Amorphous Silicon Thin-Film Growth, presented at the Fall Meeting of the Materials Research Society, Boston, USA, Nov. 27 – Dec. 1, 1995 ("Ohira") in view of Kinema/SIM or Reeves or Cohen. These are the only pending claims in the subject application. All of the rejections of the pending claims are appealed.

IV. STATUS OF AMENDMENTS (37 CFR § 1.192(C)(4))

There have been no amendments filed subsequent to the mailing of the final rejections.

[1] Applicants note that they may not have a correct copy of the Kinema/SIM reference in their possession. Applicants have requested that the examiner mail a copy of the same to Applicants, but as of the filing of this Appeal Brief, Applicants have not received the same.

V. SUMMARY OF INVENTION (37 CFR § 1.192(c)(5))

The present invention is directed to simulating phenomena, such as crystal growth, surface adsorption, and surface damage, of a particle formed of substrate particles and adsorbate particles (Specification, p. 1, lines 14-16). Experimental processes for detecting and analyzing molecular details of new materials include the use of a scanning tunneling microscope (STM) or an atomic force microscope (AFM) (Specification, p. 1., lines 19-24). However, such experimental processes are inadequate to provide the required level of detection and analysis (Specification, p. 1, lines 24-26). For example, the simulation of phenomena at an atomic or molecular level is often required in order to detect the various processes involved in the phenomena (Specification, p. 2, lines 1-3). Such simulations are difficult to achieve using a molecular dynamics method, because it is difficult to manually enter the large amount of required particle data, which is different for each simulated particle (Specification, p. 2, lines 6-12). Further, programs that have been developed to generate molecular data for each particle require a long time to execute because the programs must be executed separately for each particle, and different programs must be run for each simulated phenomena (Specification, p. 2, lines 14-19).

Generally, the simulation apparatus and method of the present invention sets the kinetic conditions of particles to be simulated and displays the set conditions (Specification, p. 8, lines 18-21).[2] Particles are then generated depending on the set conditions, and the interaction of the generated particles is computed and displayed (Specification, p. 8, line 23 – p. 9, line 3).[3] More specifically, atomic structure information of molecules and crystals is stored, and an operator using the simulation apparatus and method of the present invention can select a particle as the object of simulation from the stored atomic structure information (Specification, p. 9, lines 6-10). A stored aggregation of programs is used to compute the interaction between particles depending on the set conditions (Specification, p. 9, lines 18-21). In an embodiment of the present invention, each particle is composed of a stationary substrate particle and an adsorbate particle that collides with the substrate particle (Specification, p. 10, lines 7-16).

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[2] See the kinetic condition setting unit or the setting operation of independent claims 1, 12, 16, 20, and 22-24.

[3] See the particle motion computing unit or the generating operation of independent claims 1, 12, 16, 20, and 22-24.

Using the present invention, an operator can observe a simulation of the interaction between various particles (Specification, p. 2, line 22 – p. 3, line 7; p. 10, lines 4-6).

VI. ISSUES (37 CFR § 1.192(c)(6))

The first primary issue is whether claims 1, 3-9, 11-20, and 22-31 comply with the enablement and written description requirements of 35 U.S.C. § 112, first paragraph.

The first subsidiary issue is whether the source code that was submitted, pursuant to 37 CFR § 1.52(e), with the Response To Final Office Action that was filed on February 21, 2003 (at the request of the examiner) complied with the requirements of 37 CFR § 1.52(e).

The second subsidiary issue is whether the amendments to claims 1, 16, 20, 23, and 24 that were presented in the August 22, 2002 Amendment were supported by the Specification.

The second primary issue is whether claims 1, 16, 20, 23, and 24 are sufficiently definite under 35 U.S.C. § 112, second paragraph.

The third primary issue is whether the examiner has established a *prima facie* case of obviousness in regard to the rejections of claims 1, 3-9, 11-20, and 22-31 under 35 U.S.C. § 103(a).

The third subsidiary issue is whether the examiner has properly supported his assertions of inherency with concrete evidence.

The fourth subsidiary issue is whether the examiner has properly presented the motivation to combine the references.

VII. GROUPING OF CLAIMS (37 CFR § 1.192(c)(7))

Group 1 includes independent claims 12 and 22 and dependent claims 13-15, which stand or fall together. Group 2 includes independent claims 1, 16, 20, 23, and 24 and dependent claims 3-9, 11, 17-19, and 25-31, which stand or fall together. Group 1 may stand with Group 2 or may stand or fall separately.

VIII. ARGUMENT (37 CFR § 1.192(c)(8))

A. Claims 1, 3-9, 11-20, and 22-31 comply with the enablement and written description requirements of 35 U.S.C. § 112, first paragraph

Claims 1, 3-9, 11-20, and 22-31 stand finally rejected under 35 U.S.C. § 112, first paragraph, for lack of enablement and an improper written description. Despite the Applicants' removal of the term "combined" from the claims in the February 21, 2002 Amendment After Final Rejection, the examiner continues to read the term "combined" into the claims. Specifically, the examiner acknowledges that the claims recite "formed" particles; however, the examiner continues by asserting that "[t]he particles therefore would have to be *combined* somehow during the course of the simulation. How is this done? It would constitute undue experimentation for a reader of any issued patent to make and/or use the claimed invention" (3-18-2003 Advisory Action, p. 2-3, which was incorporated by reference into the 4-18-2003 Final Office Action) (emphasis in original).

The Examiner has previously asserted that adsorbate particles and substrate particles, and the simulations of such particles, are known (1-8-2001 Office Action, p.10). In the Applicants' June 8, 2001 Response, they asserted that "particles formed of adsorbate particles and substrate particles are also known. Various embodiments of the present invention are directed to 'simulating' such a known combined particle. Please note that the claims do not recite the process of 'combining.' Therefore, it is respectfully submitted that there is no further need to define how such particles are combined." (6-8-2001 Response, p. 5) Therein, the Applicants further stated that "FIG. 2(a) of Misaka (cited by the Examiner) shows a combined particle, such as that in various embodiments of the present invention, although Misaka does not name it a 'combined particle.'" (6-8-2001 Response, p. 5)

In the September 24, 2001 Final Office Action, the examiner continued to assert the rejections under § 112, first paragraph. In the examiner's Claim Interpretations section of that Office Action, he stated that "[i]n so far as Applicants have stated (first paragraph, page 5, paper # 26) that limitations directed at 'combining' are not to be given patentable weight, the Examiner interprets that reference [sic] to 'absorbate' [sic] and 'substrate' refer to intended use. There are no functional limitations which refer to 'absorbate' [sic] and 'substrate' other than *denotation* of the individual particles. A recitation of the intended use of the claimed invention

must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Therefore, any prior art which recites simulation of a trajectory of a 'combined particle' is interpreted as reading on the claims." (9-24-2001 Final Office Action, p. 4-5) (emphasis and errors in original).

Clearly, the examiner, beginning in late 2001, had no reason to continue the § 112, first paragraph rejections of the claims. In fact, in order to support the same, the examiner begins discussing the patentability of the claims over the cited references, which is irrelevant to the § 112, first paragraph rejections. However, to appease the examiner, the Applicants, in the February 21, 2002 Amendment After Final Rejection, stated that "the rejections appear to be based on the meaning of the term 'combined' in 'combined particle' as recited in the claims," and amended the claims to eliminate the term "combined." (2-21-2002 Amendment After Final Rejection, p. 8). The Applicants further stated that "[f]or example, the amended claim 1 now simply recites 'a particle formed of adsorbate particles and substrate particles.' Particles formed are [sic] adsorbate particles and substrate particles are well-known. Therefore, it is respectfully submitted that the claims are clear, and are fully supported by the specification." (2-21-2002 Amendment After Final Rejection, p. 8).

However, the examiner yet again continued the § 112, first paragraph rejections in the March 22, 2002 Office Action, without any response to the Applicants' arguments. As a result, in the August 22, 2002 Amendment, in yet another attempt to appease the examiner and advance prosecution, the Applicants amended claims 1, 16, 20, 23, and 24 to recite that "the information includes a position of a corresponding emission source, a temperature, a chemical composition of the particle, a region, a physical condition, a velocity of each atom forming the particle, and a direction." (8-22-2002 Amendment). The Applicants noted that "[f]rom the Examiner's comments, it appears as if the Examiner is not placing any relevance on the terms 'adsorbate' and 'substrate' as the Applicants are using them. However, the Applicants note that the Specification discloses that the adsorbate particle collides with the substrate particle (p. 10, lines 15-16) and that particles have adjustable properties, including the emission source, the

temperature control particle, the fixed particle, the free particle, etc. (Fig. 4; p. 32, lines 4-5, 14-15)." (8-22-2002 Amendment, p. 5).

Seemingly on cue, the examiner once again repeated the § 112, first paragraph rejections in the September 17, 2002 Final Office Action. However, the examiner added that he could not locate support for the added features, specifically "a chemical composition of the particle" and "a physical condition" (9-17-2002 Final Office Action, p. 3-4). Support for the added features is addressed in subsection 2 (below). As is routine by now, the examiner, in the March 18, 2003 Advisory Action and the April 18, 2003 Final Office Action, continues to ignore the Applicants' numerous previous arguments and claim amendments, and he maintains the rejections under 35 U.S.C. § 112, first paragraph and his position that the claim amendments lack Specification support.

In addition, concurrently with the February 18, 2003 Response To Final Rejection, the Applicants submitted a copy of the source code in a last-ditch attempt to satisfy the examiner. Alas, in the April 18, 2003 Final Office Action, the examiner dismissed the source code on its face, by stating that portions thereof had dates that were after the Applicants' filing date (see arguments thereto in subsection 1 below).

The Applicants respectfully submit that they have made persuasive arguments and have even eliminated the language that was troubling the examiner from the claims. The Applicants have even, at great expense, submitted source code at the examiner's request. However, the Applicants, despite their best efforts to advance prosecution and narrow the outstanding issues, have not been successful in persuading the examiner that the claims should not be rejected under 35 U.S.C. § 112, first paragraph, and now respectfully submit the same to the Board for its review.

1. The source code that was submitted, pursuant to 37 CFR § 1.52(e), on February 21, 2003 complied with the requirements of 37 CFR § 1.52(e)

The examiner made repeated requests that the Applicants submit a copy of the Applicants' software package so that the Examiner can determine what constitutes "combined" or "formed" (3-18-2003 Advisory Action, p. 2-3 (which, notably, was mailed in response to the

Applicants' submission of source code); 9-17-2002 Final Office Action, p. 2-3; 3-22-2002 Office Action, p. 2-3; 9-24-2001 Final Office Action, p. 2-3; 1-8-2001 Office Action, p. 4; 6-9-2000 Final Office Action, p. 3; 12-22-1999 Office Action, p. 3). Prior to February 18, 2003, the Applicants did not deem it necessary to submit such source code, deciding instead to amend the claims and argue the rejections. However, over time, the Applicants began to realize that the examiner was delaying the prosecution of the subject application indefinitely until he was provided with a copy of the Applicant's source code.

On February 18, 2003, the Applicants, in an effort to appease the examiner, filed a Source Code Submission Pursuant To 37 CFR § 1.52(e), which included two properly-labeled copies of the source code on compact disc, an identification of the machine format and the operating system compatibility, and a list of files that was sufficient to identify, maintain, and interpret the information on the compact discs. However, despite the Applicants' best efforts to advance prosecution, the examiner summarily rejected the source code submission by stating that "Applicants have submitted source code listings (paper # 37) in response to a request for code. However, it is noted that many of the programs contain dates which indicate that at least many of the code blocks were developed after Applicant's filing date. Therefore, the 112 rejections are maintained." (4-18-2003 Final Office Action, p. 2).

The Applicants note that all of the files that were listed on the six-page list of files, which was attached to the Source Code Submission, have a creation date of January 31, 2003. That date corresponds to the creation date of the discs, and does not correspond in any way to each file's original creation date. The Applicants respectfully submit that the requirement of listing the dates of creation of the files is for ease of identification purposes only, and that, because each file has a unique name, each file is easily identifiable.

The Applicants further note that several of the files, e.g., "adforc.F90," "adjtxx.F90," etc., upon opening the same, indicate dates (to the right of the author) that are subsequent to the filing date of the subject application. However, despite the great effort expended by the Applicants to compile all of the files to satisfy the repeated requests of the examiner, apparently, the examiner's discovery of several of such dates ended his review of the source code, because he does not provide any analysis thereafter, and continues to assert the rejections under 35 U.S.C. § 112, first paragraph.

The Applicants respectfully submit that they did not intend for the source code to provide any missing disclosure, nor did the Applicants intend for the source code to become part of the Specification. In fact, the Applicants stated those exact words to the examiner on page 2 of the February 18, 2003 Response To Final Rejection, which was filed concurrently with the Source Code Submission. However, because the source code is not to form part of the Specification or provide any missing disclosure, the dates listed inside each file of the source code should be irrelevant. Therefore, the Applicants respectfully submit that the source code submission was proper, and that the same should, along with the lengthy record of the Applicants' argument regarding how particles are formed, finally result in the withdrawal of the rejections under 35 U.S.C. § 112.

2. The August 22, 2002 amendments to claims 1, 16, 20, 23, and 24 are supported by the Specification

In the August 22, 2002 Amendment, independent claims 1, 16, 20, 23, and 24 were amended to recite that "the information can include a position of a corresponding emission source, a temperature, a chemical composition of the particle, a region, a physical condition, a velocity of each atom forming the particle, and a direction."

In the September 17, 2002 Final Office Action, the examiner stated that the Applicants had not yet pointed out enabling and written description support in the specification for these amendments (9-17-2002 Final Office Action, p. 3-4). The examiner further stated that he has been unable to locate enabling and written description support for "a chemical composition of the particle" and a "physical condition" (9-17-2002 Final Office Action, p. 3-4). In the February 21, 2003 Response To Final Rejection, the Applicants noted that page 11, lines 10-13 of the Specification provided such support (2-21-2003 Response To Final Rejection, p. 2).

Despite providing this section of the Specification to the examiner, the examiner repeated his statements in the March 18, 2003 Advisory Action (by simply attaching a copy of the entire September 17, 2002 Final Office Action and stating that the Applicants have been unresponsive as the reason for upholding the rejections) and again in the April 18, 2003 Final Office Action (by simply stating that "[a]ll other rejections are maintained in so far as Applicants have not amended the claims nor persuasively argued the rejections" and directing the

Applicants' attention to the September 17, 2002 Final Office Action and the March 18, 2003 Advisory Action).

If the examiner did consider the cited section of the Specification, which states that "practical substances to be used as the adsorbate particle and substrate particle can be selected by an operator from molecular structure DB 51, crystal structure DB 52 or molecular crystal DB 53," (Specification, p. 11, lines 10-13) and found that section unhelpful, he should have at least referred to the other portions of the Specification that discussed the adsorbate and substrate particles and the three databases 51-53. If the examiner would have done as the Applicants are now forced to argue, the examiner would have been led to page 9, lines 4-7, which discloses that the databases 51-53 "store atomic structure information of molecules and crystals," and to page 10, lines 15-16, which discloses that "[t]he adsorbate particle is a particle colliding with a stationary particle during, for example, film formation." If the examiner were still confused, he should have noted that the particles of the present invention have adjustable properties, as discussed in connection with Figure 4 (Specification, p. 14, line 11 – p. 15, line 24; Fig. 4). Because an operator can select from different particles based on the desired molecular and crystal structures (Specification, p. 9, lines 7-10), the Applicants did not deem it necessary to explain to the examiner the choice of the terms "chemical composition" and "physical condition" of the particles.

Although the Applicants did not deem it necessary to demonstrate to the examiner that the various terms in the Specification may be further discussed elsewhere, it should be clear upon objective review that the recitations of "a chemical composition of the particle" and "a physical condition" are sufficiently enabled and described in the Specification. As a result, the Applicants respectfully submit that independent claims 1, 16, 20, 23, and 24 (as amended on August 22, 2003) are fully enabled and described pursuant to the requirements under 35 U.S.C. § 112, first paragraph. If independent claims 1, 16, 20, 23, and 24 are determined to be in violation of the enablement or written description requirements of 35 U.S.C. § 112, first paragraph as a result of the August 22, 2002 amendments, the Applicants respectfully submit that such violation does not affect the patentability of independent claims 12 and 22, which do not recite such terms.

B. Claims 1, 16, 20, 23, and 24 are sufficiently definite under 35 U.S.C. § 112, second paragraph

Claims 1, 16, 20, 23, and 24 stand finally rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness. Specifically, the examiner states that the term "a physical condition" is ambiguous (3-18-2003 Advisory Action, p. 4, which was incorporated by reference into the 4-18-2003 Final Office Action).

The Applicants respectfully incorporate the arguments from section VIII (above) as if the same were fully set forth herein. The Applicants respectfully submit that the same sections of the Specification as cited therein support a finding that the term "a physical condition," as recited in independent claims 1, 16, 20, 23, and 24, is sufficiently definite pursuant to 35 U.S.C. § 112, second paragraph. Therefore, independent claims 1, 16, 20, 23, and 24 distinctly claim the subject matter that the Applicants regard as the invention.

If independent claims 1, 16, 20, 23, and 24 are determined to be indefinite pursuant to 35 U.S.C. § 112, second paragraph as a result of the August 22, 2002 amendments, the Applicants respectfully submit that such violation does not affect the patentability of independent claims 12 and 22, which do not recite "a physical condition."

C. The examiner has not established a *prima facie* case of obviousness in regard to the rejections of claims 1, 3-9, 11-20, and 22-31 under 35 U.S.C. § 103(a)

Due to the length of the listing of the rejections under 35 U.S.C. § 103(a), they are not repeated here; however, the same are listed in section III (above).

MPEP § 706.02(j) sets forth the contents of a rejection under § 103: "To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of

success must both be found in the prior art and not based on applicant's disclosure" (emphasis in original).

The Applicants respectfully submit that the examiner has not established a *prima facie* case of obviousness because the examiner has not properly supported his assertions of inherency (for purposes of establishing that the references teach or suggest all of the claim limitations) and because the examiner has not properly presented the motivation to combine the references.

1. The examiner has not properly supported his assertions of inherency with concrete evidence

The examiner continues to frequently rely on assertions of inherency as disclosing elements of the present invention. For example, in regard to the rejection of claim 1, the examiner asserts that the kinetic condition setting unit and the particle motion computing unit are "inherent in particle simulators such as Monte Carlo simulators." (March 22, 2002 Office Action, item 12, pages 5-6; September 17, 2002 Office Action, item 13, pages 6-7; March 18, 2003 Advisory Action, item 13, page 7; April 18, 2003 Final Office Action (incorporating the March 18, 2003 Advisory Action))

In the Amendment filed on August 22, 2002, the Applicants traversed the examiner's assertions of inherency that were found in the March 22, 2002 Office Action. The Applicants cited the standard to be applied, i.e., concrete evidence, and argued that the examiner did not meet that standard in supporting his assertions of inherency. Specifically, the Applicants argued as follows:

> "The Applicants respectfully traverse the Examiner's assertions of inherency (e.g., in regard to particle simulators and cluster simulation). The inherent teachings of a prior art reference are questions of fact. In re Napier, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995). With respect to core factual findings in a determination of patentability, the Examiner cannot simply reach conclusions based on his own understanding or experience, or on an assessment of what would be basic knowledge or common sense. In re Zurko, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001). Rather, the Examiner must point

to some concrete evidence in the reference in support of his findings. Id." (August 22, 2002 Amendment, p. 6) (underlining in original)

In the examiner's Response to Arguments, at item 65 on page 33 of the September 17, 2002 Office Action, the examiner failed to respond substantively to the Applicants' arguments from the August 22, 2002 Amendment. Instead, the examiner charged that the Applicants misstated the references, and directed the Applicants to refer to the references. However, the examiner continued his assertions of inherency, highlighting the same in italicized bold print and with double-underlining, without presenting any concrete evidence in support thereof. Specifically, the examiner responded as follows:

"Applicant's characterization of the teachings of Baumann and Misaka again trivializes and misstates their inventions – ***Again***, please refer to the detailed rejections as well as the teachings. For example, the characterization of the Baumann teaching as "...incoming spheres..." again ignores the teaching of a simulation of Sputtering – *that which Applicant is attempting to claim.* ***Page 4.4.2 of Baumann discloses molecular dynamic simulation (simulation of trajectories).*** As per Misaka, see fig. 2; col. 9, line 65 to col. 10, line 9, wherein trajectories are discussed. ***In either Baumann or Misaka, it is inherent that a source must exist for each particle.***" (September 17, 2002 Office Action, p. 33, item 65) (emphasis in original)

The Applicants respectfully submit that they have repeatedly read the references; however, the Applicants cannot properly evaluate the examiner's assertions of inherency, which relate to core factual findings in the determination of patentability, until the examiner actually addresses the issue of whether the inherency is properly supported. The Applicants respectfully submit that simply restating that something is inherent does not address the issue of whether a determination of inherency is proper.

The Applicants have repeatedly argued this issue to the examiner, most recently in the February 18, 2003 Response To Final Rejection, only to be continually ignored. In fact, the examiner's only response thereto appears in item 54, on page 28 of the March 18, 2003 Advisory Action, where the examiner states that "Applicants have not addressed the merits of the rejections other than to allege that they are somehow improper (inherency, motivation, for example). These arguments are not persuasive. Applicants appear to argue that it is not

inherent to have a particle source for a particle simulation. The Examiner wonders how such a simulation could be carried out without specifying a source. The particles must be accounted for at all times in their trajectories, including initial conditions. It is noted that the Examiner has relied on inherency since at least paper #6 (*five years ago* – 1998). Applicants have earlier acquiesced to such a determination by their silence. The Examiner respectfully submits that such arguments are late in the prosecution and respectfully are simply not persuasive. Again, Applicans [sic] have not explained or even offered any reasoning how such a simulation as disclosed in the art could be carried out without specifying a source." (3-18-2003 Advisory Action, p. 28) (errors in original). Such a response ignores the fact that the Applicants are not arguing the merits of the rejections because the rejections themselves are deficient. The examiner's assertion that the Applicants have somehow admitted the various assertions of inherency are without support, and are therefore incorrect. Clearly, the examiner is not aware that he must first present a sufficient rejection before the Applicants are required to substantively respond thereto. Further, the examiner's discussion of only a single assertion of inherency trivializes the extent to which the examiner relies on the principle of inherency in his rejections.

In item 55, on page 28 of the March 18, 2003 Advisory Action, the examiner continues by stating that "Applicants [sic] refusal to argue the merits of the rejections because of alleged deficiencies is based upon an unproven premise. The rejections are maintained." (3-18-2003 Advisory Action, p. 28) (errors in original). Apparently, the examiner does not place much credence in the opinions of the Federal Circuit, despite an opinion on an appeal from the Board of Patent Appeals and Interferences in which the Federal Circuit restated the long-standing rule that administrative agencies are "not free to refuse to follow circuit precedent." In re Sang Su Lee, 277 F.3d 1338, 1344 (Fed. Cir. 2002) (citing National Labor Relations Bd. v. Ashkenazy Property Mgt. Corp., 817 F.2d 74, 75 (9th Cir. 1987)).

The Applicants respectfully assert that the examiner's assertions of inherency are improper, and therefore, must be withdrawn. The Applicants further respectfully submit that because the examiner has not properly supported his assertions of inherency, that he has not presented a *prima facie* case of obviousness. Therefore, the Applicants respectfully submit that the rejections of claims 1, 3-9, 11-20, and 22-31 under 35 U.S.C. § 103(a) should be withdrawn.

2. The examiner has not properly presented the motivation to combine the references

MPEP § 2142 states that "[w]hen the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the examiner to explain why the combination of the teachings is proper." The examiner is required to present actual evidence and make particular findings related to the motivation to combine the teachings of the references. In re Kotzab, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); In re Dembiczak, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Broad conclusory statements regarding the teaching of multiple references, standing alone, are not "evidence." Dembiczak, 50 USPQ2d at 1617. "'The factual inquiry whether to combine the references must be thorough and searching.'" In re Lee, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002) (citing McGinley v. Franklin Sports, Inc., 60 USPQ2d 1001, 1008 (Fed. Cir. 2001)). The factual inquiry must be based on objective evidence of record, and cannot be based on subjective belief and unknown authority. Id. at 1433-34. The examiner must explain the reasons that one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious. In re Rouffet, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998).

The Applicants argued the above standard in the August 22, 2002 Amendment. The Applicants further argued the following:

> The examiner has not presented any evidence why any of the references would have been combined. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. MPEP § 2143.01. Specifically, there must be a suggestion or motivation in the references to make the combination or modification. Id. The examiner does not even assert that someone of ordinary skill in the art would have been motivated to combine any of the references at the time the invention was made. Further, such motivation does not appear anywhere in any of the references, and the examiner has not presented any actual evidence in support of the same. Such a basis does not

> adequately support the combination of references; therefore, the combinations are improper and must be withdrawn. (8-22-2002 Amendment, p. 7).

In the examiner's Response to Arguments, at item 63, on page 32 of the September 17, 2002 Office Action, the examiner dismissed the Applicants' arguments by stating the following:

> In response to the abstract and conclusory arguments pertaining to *obviousness* and *motivation to combine* (pp. 6-7, paper # 34), please review the 103 rejections. (Emphasis in original)

The Applicants respectfully submit that they have reviewed the 103 rejections. The examiner, in asserting the 103 rejections, simply does not assert any motivation to combine the references. The Applicants' argument thereon may appear to the examiner to be abstract and conclusory, but the examiner has not presented any actual evidence on which the Applicants could comment. The Applicants have repeatedly provided the standard to the examiner, which requires the examiner to set forth the motivation to combine the references, as a courtesy. The Applicants have repeatedly argued that the examiner has failed to meet that standard. However, the examiner has, each time, summarily dismissed the Applicants' arguments without addressing the substance of the same.

Further, in item 63, on page 32 of the April 18, 2003 Final Office Action (which incorporates the 3-18-2003 Advisory Action), the Examiner states that "one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references" (citing In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981) and In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The Examiner misapplied the holdings of those cases.

The applicant in In re Keller argued that the Walsh reference could not properly be combined with either of the Keller or Berkovits references because they discussed non-analogous art. In re Keller, 208 USPQ at 880. The Court of Customs and Patent Appeals found that Walsh was sufficiently analogous to Keller and Berkovits to support its combination therewith. Id. at 881. The CCPA then noted that once a prima facie case of obviousness was established, the burden shifts to the applicant to rebut it with objective evidence of non-obviousness. Id. at 882. The applicant in In re Keller produced an affidavit that disputed the Examiner's interpretation of what the Walsh reference disclosed. Id. The CCPA then stated

that "one cannot show non-obviousness by attacking the references individually where, as here, the rejections are based on the combinations of references." Id. The CCPA was commenting on the applicant's rebuttal of the obviousness conclusion in light of the conclusion that the combination was properly motivated. In fact, the CCPA addressed the references individually in determining whether sufficient motivation to combine the references existed. Id. at 881.

In In re Merck & Co., the Federal Circuit applied the quoted statement above from In re Keller to a similar factual setting, i.e., where the motivation to combine the references was already upheld, to hold that the applicant could not challenge one reference individually out of a combination of references. In re Merck & Co., 231 USPQ at 379-80.

In interpreting both cases, the Examiner simply misinterpreted the context in which the quoted statement was made in attempting to apply the holdings thereof to the subject application. The Applicants have challenged the Examiner's combination of the references based on a lack of motivation to combine the references. In doing so, the Applicants have treated the references as unable to be combined, and thus, only deserving of being addressed separately. Until the examiner supports the motivation to combine the references, there is no proper combination of the same warranting further argument.

Because the examiner still has not presented any actual evidence of the motivation to combine the references, as is repeatedly required by the Federal Circuit, the Applicants respectfully repeat their request that the rejections under 35 U.S.C. § 103(a) be withdrawn for lack of the required motivation to combine the references.

IX. CONCLUSION

In summary, for the reasons set forth above and in the Amendments filed during prosecution, it is submitted that claims 1, 3-9, 11-20, and 22-31 patentably distinguish over the cited references and fully comply with 35 U.S.C. §112, first and second paragraphs. Thus, it is respectfully submitted that the examiner's final rejection of the claims is therefore without support and, therefore, erroneous. Accordingly, the Appellants respectfully urge the Board of Patent Appeal and Interferences to so find and reverse the examiner's final rejection.

The required fee in the amount of $330.00 is attached. The Patent Office is authorized to charge any additional fees to Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Dated: 10-10-2003

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APPENDIX (37 CFR § 1.192(c)(9))

1. (PREVIOUSLY PRESENTED) An apparatus for simulating phenomena of a particle formed of adsorbate particles and substrate particles, comprising:

a kinetic condition setting unit which sets information for defining a plurality of generation periods and a corresponding number of adsorbate particles to be generated during each generation period wherein the information can include a position of a corresponding emission source, a temperature, a chemical composition of the particle, a region, a physical condition, a velocity of each atom forming the particle, and a direction; and

a particle motion computing unit which generates the adsorbate particles in accordance with the information set by the kinetic condition setting unit and computes motion of the generated adsorbate particles, to simulate phenomena of said particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source wherein

for each adsorbate particle, the kinetic condition setting unit sets a region indicating a position of the corresponding emission source, and

the particle motion computing unit generates each adsorbate particle in accordance with the position of the corresponding emission source.

2. (CANCELED)

3. (PREVIOUSLY PRESENTED) An apparatus as in claim 1, wherein

before generating the adsorbate particles, the particle motion computing unit generates the substrate particles.

4. (ORIGINAL) An apparatus as in claim 1, further comprising:

a display which allows a user to enter the information set by the kinetic condition setting unit.

5. (PREVIOUSLY PRESENTED) An apparatus as in claim 1, wherein

the kinetic condition setting unit sets information for generating the substrate particles.

6. (PREVIOUSLY PRESENTED) An apparatus as in claim 1, wherein

each adsorbate particle is formed of atoms;

the information set by the kinetic condition setting unit includes information indicating whether the atoms of a respective adsorbate particle are static against a center of mass of the adsorbate particle; and

when the particle motion computing unit generates an adsorbate particle and the information set by the kinetic condition setting unit indicates that the atoms of the respective adsorbate particle are not static against the center of mass, the particle motion computing unit provides a random orientation to the atoms of the adsorbate particle.

7. (ORIGINAL) An apparatus as in claim 6, further comprising:

a display which allows a user to enter the information set by the kinetic condition setting unit.

8. (PREVIOUSLY PRESENTED) An apparatus as in claim 1, wherein

each adsorbate particle is formed of atoms;

the information set by the kinetic condition setting unit includes information indicating whether the atoms of a respective adsorbate particle are static against a center of mass of the adsorbate particle; and

when the particle motion computing unit generates an adsorbate particle and the information set by the kinetic condition setting unit indicates that the atoms of the respective adsorbate particle are not static against the center of mass, the particle motion computing unit provides an initial velocity to the atoms of the adsorbate particle.

9. (PREVIOUSLY PRESENTED) An apparatus as in claim 1, wherein, when generating an adsorbate particle, the particle motion computing unit provides a random direction within a cone pointed at a substrate and being centered at a point of generation of center of mass velocity of the adsorbate particle.

10. (CANCELED)

11. (ORIGINAL) An apparatus as in claim 1, further comprising:

a display which displays the information set by the kinetic condition setting unit.

12. (PREVIOUSLY PRESENTED) An apparatus for simulating phenomena of a particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source, the apparatus comprising:

an input device which allows a user to designate a region;

a kinetic condition setting unit which, for each adsorbate particle, sets the region designed by the user as a region indicating a position of the corresponding emission source; and

a particle motion computing unit which generates the adsorbate particles in accordance with the position of the corresponding emission source as indicated by the region designated by the user and computes motion of the generated adsorbate particles, to simulate phenomena of said particle formed of adsorbate particles and substrate particles.

13. (ORIGINAL) An apparatus as in claim 12, wherein the input device is a display.

14. (ORIGINAL) An apparatus as in claim 12, further comprising:

a display which displays the information set by the kinetic condition setting unit.

15. (PREVIOUSLY PRESENTED) An apparatus as in claim 14, wherein the display shows the adsorbate particles generated by the particle motion computing unit and indicates the motion computed by the particle motion computing unit.

16. (PREVIOUSLY PRESENTED) An apparatus for simulating phenomena of a particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source, the apparatus comprising:

a kinetic condition setting unit which sets information for defining kinetic conditions of the adsorbate particles wherein the information can include a position of a corresponding emission

source, a temperature, a chemical composition of the particle, a region, a physical condition, a velocity of each atom forming the particle, and a direction; and

a particle motion computing unit which generates the adsorbate particles in accordance with the information set by the kinetic condition setting unit and the position of the corresponding emission source, and computes motion of the generated adsorbate particles, to simulate phenomena of said particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source.

17. (PREVIOUSLY PRESENTED) An apparatus as in claim 16, wherein

the adsorbate particles move towards the substrate particles,

the kinetic condition setting unit sets a region for defining an initial position of the adsorbate particles, and

the apparatus further comprises a display which displays the relationship between the region set by the kinetic condition setting unit and a region indicating a position of a substrate particle forming said particle formed of adsorbate particles and substrate particles.

18. (PREVIOUSLY PRESENTED) An apparatus as in claim 17, wherein

the kinetic condition setting unit sets information for providing a direction of velocity to the adsorbate particles, and

the display shows the direction of velocity with respect to the region set by the kinetic condition setting unit and the region indicating the position of a respective substrate particle.

19. (ORIGINAL) An apparatus as in claim 16, further comprising:

a display which displays the information set by the kinetic condition setting unit.

20. (PREVIOUSLY PRESENTED) A computer-implemented method for simulating phenomena of a particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source, the method comprising the steps of:

setting information for defining a plurality of generation periods and a corresponding number of adsorbate particles to be generated during each generation period wherein the information can include a position of a corresponding emission source, a temperature, a

chemical composition of the particle, a region, a physical condition , a velocity of each atom forming the particle, and a direction;

generating the adsorbate particles in accordance with the information set in the setting step and the position of the corresponding emission sources;

computing motion of the generated adsorbate; and

simulating phenomena of said particle formed of adsorbate particles and substrate particles in accordance with the computed motion.

21. (CANCELED)

22. (PREVIOUSLY PRESENTED) A computer-implemented method for simulating phenomena of a particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source, the method comprising the steps of:

setting, for each adsorbate particle, a region indicating a position of the corresponding emission source;

generating the adsorbate particles in accordance with the position of the corresponding emission source as indicated by the region set in the setting step;

computing motion of the generated adsorbate particles; and

simulating phenomena of said particle formed of adsorbate particles and substrate particles in accordance with the computed motion.

23. (PREVIOUSLY PRESENTED) A method for simulating phenomena of a particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source, the method comprising:

setting information for defining kinetic conditions of the adsorbate particles wherein the information can include a position of a corresponding emission source, a temperature, a chemical composition of the particle, a region, a physical condition, a velocity of each atom forming the particle, and a direction;

displaying the set information;

generating the adsorbate particles in accordance with the set information and the positions of the corresponding emission sources; and

computing motion of the generated adsorbate particles, to simulate phenomena of said particle formed of adsorbate particles and substrate particles, each adsorbate particle having a corresponding emission source.

24. (PREVIOUSLY PRESENTED) An apparatus for simulating phenomena of a particle formed with adsorbate particles, comprising:

a kinetic condition setting unit which sets information for defining kinetic conditions of the adsorbate particles wherein the information ~~can~~ include a position of a corresponding emission source, a temperature, a chemical composition of the particle, a region, a physical condition, a velocity of each atom forming the particle, and a direction; and

a particle motion computing unit which generates the adsorbate particles in accordance with the information set by the kinetic condition setting unit and computes motion of the generated adsorbate particles, to simulate phenomena of said particle formed with adsorbate particles, each adsorbate particle having a corresponding emission source, wherein

for each adsorbate particle, the kinetic condition setting unit sets a region indicating a position of the corresponding emission source, and

the particle motion computing unit generates each adsorbate particle in accordance with the position of the corresponding emission source as indicated by the region set by the kinetic condition setting unit.

25. (ORIGINAL) An apparatus as in claim 24, wherein the information set by the kinetic condition setting unit defines a plurality of generation periods and a corresponding number of adsorbate particles to be generated during each generation period by the particle motion computing unit.

26. (PREVIOUSLY PRESENTED) An apparatus as in claim 24, wherein

said particle formed with adsorbate particles is formed with both adsorbate particles and substrate particles,

the information set by the kinetic condition setting unit includes information for defining kinetic conditions of the substrate particles, and

the particle motion computing unit generates the substrate particles before generating the adsorbate particles.

27. (PREVIOUSLY PRESENTED) An apparatus as in claim 24, wherein

said particle formed with adsorbate particles is formed with both adsorbate particles and substrate particles,

each substrate particle includes a fixed particle and a temperature control particle,

the information set by the kinetic condition setting unit includes information for defining kinetic conditions of the fixed particle and the temperature control particle, and

the particle motion computing unit generates the fixed particle and the temperature control particle of each substrate particle in accordance with the information set by the kinetic condition setting unit.

28. (ORIGINAL) An apparatus as in claim 24, further comprising:

a display which displays the information set by the kinetic condition setting unit.

29. (PREVIOUSLY PRESENTED) An apparatus as in claim 24, wherein

each adsorbate particle includes a plurality of atoms;

the information set by the kinetic condition setting unit includes information indicating whether the atoms of a respective adsorbate particle are static against a center of mass of the adsorbate particle; and

when the particle motion computing unit generates an adsorbate particle and the information set by the kinetic condition setting unit indicates that the atoms of the respective adsorbate particle are not static against the center of mass, the particle motion computing unit provides a random orientation to the atoms of the adsorbate particle.

30. (PREVIOUSLY PRESENTED) An apparatus as in claim 29, wherein, when the particle motion computing unit generates an adsorbate particle and the information set by the kinetic condition setting unit indicates that the atoms of the respective adsorbate particle are not fixed against center of mass, the particle motion computing unit provides an initial velocity to the atoms of the adsorbate particle.

31. (PREVIOUSLY PRESENTED) An apparatus as in claim 24, wherein, when generating an adsorbate particle, the particle motion computing unit provides a random direction within a cone pointed at a substrate and being centered at a point of generation of center of mass velocity of the adsorbate particle.

32. (CANCELED)